

Preface

In 2007, NARSTO¹ was asked to assess the technical challenges of transitioning from an individual pollutant approach to air quality management to a risk-based approach that (a) includes integrated consideration of all pollutants that pose significant risks to human health and ecosystem function and (b) provides the information needed to assess the effectiveness of actions that might be taken to reduce these risks. This assessment was undertaken in response to a 2004 U.S. National Research Council (NRC) report: *Air Quality Management in the United States* (The National Academies Press, Washington, D.C.).

Air quality management in Canada, the United States, and Mexico has been successful in reducing air pollution, especially in urban areas. However, the 2004 NRC report concluded that the air quality management system in the United States, and presumably in other countries as well, contains inherent limitations that constrain its ability to meet future challenges such as increasingly stricter standards, the health effects of exposure to air toxics, the apparent absence of a risk threshold for most pollutants, environmental justice issues, ecosystem effects, long-range transport, and climate change.

To address these challenges, the NRC recommended that current air quality management approaches that tend to focus on independent attainment of separate air quality management standards be transformed to an approach that strives to

- Identify and assess more clearly the most significant exposures, risks, and uncertainties.
- Take an integrated multipollutant approach to controlling emissions of pollutants posing the most significant risks.
- Take an airshed-based approach by assessing and controlling emissions of important pollutants arising from local, multistate, national, and international sources.
- Emphasize results over process, create accountability for the results, and dynamically adjust and correct the system as data on progress are assessed.

This book takes a comprehensive look at how close we are to having the information and tools needed to achieve this vision. It provides comprehensive reviews of

¹ NARSTO (formerly the North American Research Strategy for Tropospheric Ozone) is a collaboration among government agencies, the private sector, and academia in Canada, the United States, and Mexico that is dedicated to advancing the scientific foundations of air quality management in North America.

current risk assessment methodologies, environmental and emission information, air quality measurements, modeling, and the underlying knowledge that supports risk assessment and evaluation of the effectiveness of air quality management policies. We also address the problem of how global-scale changes in emissions and changes in climate will affect future air quality management. The book reviews how closely past air quality management actions have approached the above-stated NRC vision, and it concludes with recommendations on how a transition to an approach that fulfills this vision might be facilitated.

We conclude that there are theoretical advantages to an integrated risk-based approach, but note that achieving it will be an evolutionary process. This evolution will require improvements in the discipline of exposure assessment and in our understanding of the consequences to human and ecosystem health of simultaneous exposure to multiple pollutants. It will require changes in monitoring approaches to support risk assessments, and it will require considerable advance planning to select the appropriate metrics for evaluating air quality management actions and to obtain the information needed to support these metrics.

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Technical Challenges of Multipollutant Air Quality
Management

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